Name: _________________________ Date: ___________________

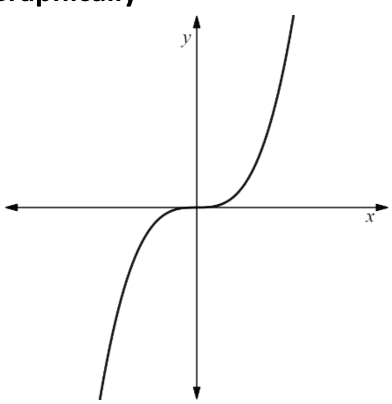
Learning Goal 2.2	Limits at infinity and the definition of the derivative

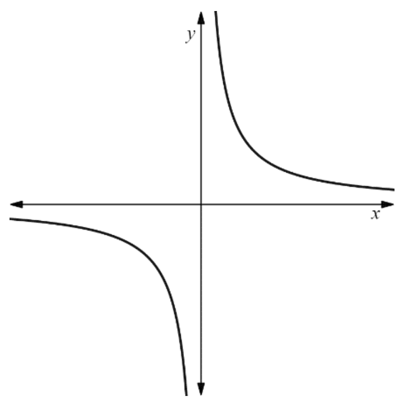
We will apply these methods to **four** different types of limits:

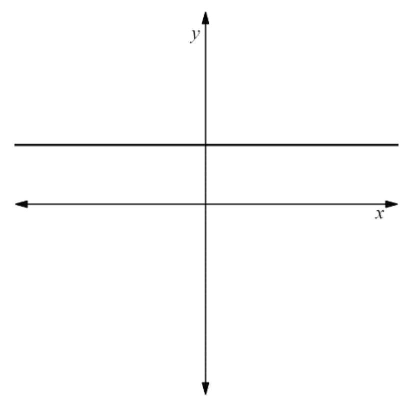
1. 2. 3. 4.

$$\lim_{x\to\infty} f(x) \qquad \lim_{x\to-\infty} f(x)$$

Graphically







Fact #1

If r is a positive rational number and number and c is any real number, then

a. $\lim_{x\to\infty} 2x^4 - x^2 - 8x$

b. $\lim_{x\to-\infty} \frac{1}{3}x^5 + 2x^3 - x^2 + 8$

If $p(x) = a_n x^n + a_{n-1}x^{n-1} + \cdots + a_1 x + a_0$ is a polynomial of degree n ($a_n \neq 0$), then

Definition

The function $f(x)$ will have a horizontal asymptote at $y = L$ if either of the following are true.

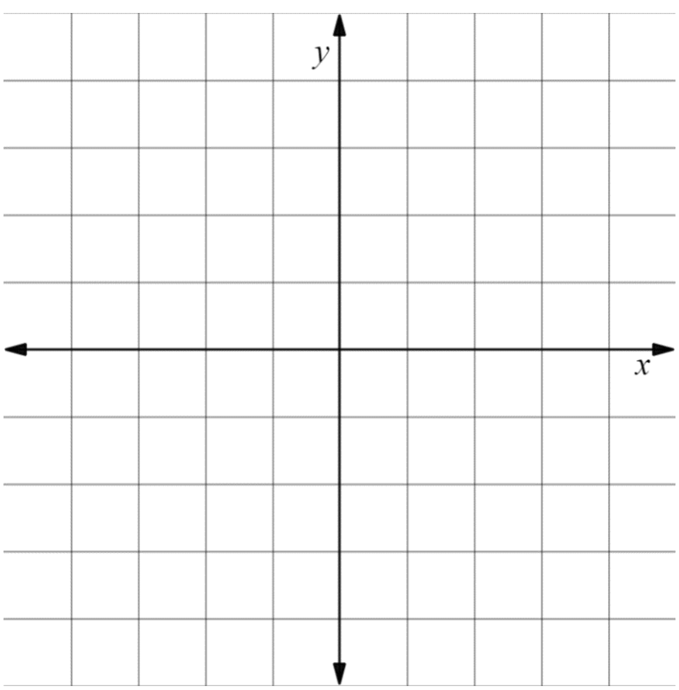
a. $\displaystyle\lim_{x\to\infty} \frac{2x^4 - x^2 - 8x}{-5x^4 + 7}$

b. $\displaystyle\lim_{x\to-\infty} \frac{2x^4 - x^2 - 8x}{-5x^4 + 7}$

c. $\displaystyle\lim_{x\to\infty} \frac{4x^2 + x^6}{1 - 5x^3}$

d. $\displaystyle\lim_{x\to-\infty} \frac{4x^2 + x^6}{1 - 5x^3}$

Example Sketch the graph of $y = (x-2)^4(x+1)^3(x-1)$ by finding its intercepts and its limits as $x \to \pm\infty$.



Assignment # 1 – 9, 13 – 21, 31, 41 – 47 Quiz Next Day!